

This Page Is Inserted by IFW Operations
and is not a part of the Official Record

BEST AVAILABLE IMAGES

Defective images within this document are accurate representations of the original documents submitted by the applicant.

Defects in the images may include (but are not limited to):

- BLACK BORDERS
- TEXT CUT OFF AT TOP, BOTTOM OR SIDES
- FADED TEXT
- ILLEGIBLE TEXT
- SKEWED/SLANTED IMAGES
- COLORED PHOTOS
- BLACK OR VERY BLACK AND WHITE DARK PHOTOS
- GRAY SCALE DOCUMENTS

IMAGES ARE BEST AVAILABLE COPY.

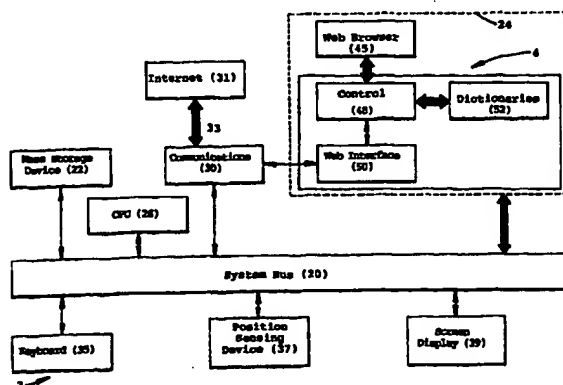
As rescanning documents *will not* correct images,
please do not report the images to the
Image Problem Mailbox.



INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification ⁶ : G06F 17/24	A1	(11) International Publication Number: WO 98/54654 (43) International Publication Date: 3 December 1998 (03.12.98)
<p>(21) International Application Number: PCT/SG97/00022</p> <p>(22) International Filing Date: 30 May 1997 (30.05.97)</p> <p>(71) Applicant (for all designated States except US): NATIONAL COMPUTER BOARD, acting through its R & D DIVISION, THE INFORMATION TECHNOLOGY INSTITUTE [SG/SG]; 11 Science Park, Singapore Science Park II, Singapore 117685 (SG).</p> <p>(72) Inventors; and</p> <p>(75) Inventors/Applicants (for US only): LAI, Kok, Fung [SG/SG]; Information Technology Institute, 11 Science Park, Singapore Science Park II, Singapore 117685 (SG). LEE, Cjin, Pheow [SG/SG]; Information Technology Institute, 11 Science Park Road, Singapore Science Park II, Singapore 117685 (SG).</p> <p>(74) Agent: K.T. LIM & COMPANY; #25-06 Tong Eng Building, 101 Cecil Street, Singapore 069533 (SG).</p>	<p>(81) Designated States: AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, EE, ES, FI, GB, GE, HU, IL, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, TJ, TM, TR, TT, UA, UG, US, UZ, VN, ARIPO patent (GH, KE, LS, MW, SD, SZ, UG), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, ML, MR, NE, SN, TD, TG).</p> <p>Published With international search report.</p>	

(54) Title: METHOD OF ANNOTATING DISPLAYS AND AN ANNOTATION MODULE



(57) Abstract

A method of annotating displays, including requesting display data, receiving and processing the display data for display items which require annotation, generating a display, using the display data, with the display items including respective annotations in the display, and accessing and displaying item data for one of the display items on selection of the respective annotation for the one of the display items. An annotation module stored on a computer readable medium, including an interception module for receiving and processing requested display data for display items which require annotations, and adding annotation data to the display data to cause generation of a display, using the display data, with the display items including respective annotations in the display. The display data is processed and annotated in real-time before the display is generated.

FOR THE PURPOSES OF INFORMATION ONLY

Codes used to identify States party to the PCT on the front pages of pamphlets publishing international applications under the PCT.

AL	Albania	ES	Spain	LS	Lesotho	SI	Slovenia
AM	Armenia	FI	Finland	LT	Lithuania	SK	Slovakia
AT	Austria	FR	France	LU	Luxembourg	SN	Senegal
AU	Australia	GA	Gabon	LV	Latvia	SZ	Swaziland
AZ	Azerbaijan	GB	United Kingdom	MC	Monaco	TD	Chad
BA	Bosnia and Herzegovina	GE	Georgia	MD	Republic of Moldova	TG	Togo
BB	Barbados	GH	Ghana	MG	Madagascar	TJ	Tajikistan
BE	Belgium	GN	Guinea	MK	The former Yugoslav Republic of Macedonia	TM	Turkmenistan
BF	Burkina Faso	GR	Greece			TR	Turkey
BG	Bulgaria	HU	Hungary	ML	Mali	TT	Trinidad and Tobago
BJ	Benin	IE	Ireland	MN	Mongolia	UA	Ukraine
BR	Brazil	IL	Israel	MR	Mauritania	UG	Uganda
BY	Belarus	IS	Iceland	MW	Malawi	US	United States of America
CA	Canada	IT	Italy	MX	Mexico	UZ	Uzbekistan
CF	Central African Republic	JP	Japan	NE	Niger	VN	Viet Nam
CG	Congo	KE	Kenya	NL	Netherlands	YU	Yugoslavia
CH	Switzerland	KG	Kyrgyzstan	NO	Norway	ZW	Zimbabwe
CI	Côte d'Ivoire	KP	Democratic People's Republic of Korea	NZ	New Zealand		
CM	Cameroon			PL	Poland		
CN	China	KR	Republic of Korea	PT	Portugal		
CU	Cuba	KZ	Kazakstan	RO	Romania		
CZ	Czech Republic	LC	Saint Lucia	RU	Russian Federation		
DE	Germany	LI	Liechtenstein	SD	Sudan		
DK	Denmark	LK	Sri Lanka	SE	Sweden		
EE	Estonia	LR	Liberia	SG	Singapore		

- 1 -

METHOD OF ANNOTATING DISPLAYS AND AN ANNOTATION MODULE

5

Field of the Invention

10

The present invention relates to a method of annotating displays and an annotation module, which are particularly, but not exclusively, useful for annotating Internet documents.

Background of the Invention

15

The worldwide computer network known as the Internet is primarily based on the "client-server" model of information exchange. In this "distributed computing" environment, a server (host), which is normally a powerful computer or group of computers, behaves as a single computer and services the requests of a large number of smaller computers, or
20 clients, which connect to it.

The Internet supports a large variety of information transfer protocols. Of these, the Hypertext Transfer Protocol (http) which supports the World Wide Web (the "web") is probably the most prominent. An important feature of the web is the ability to connect one file,
25 or web page, to many other pages using "hypertext" links. A link appears either as an underlined or highlighted portion of text, or simply as part of an image object in a document. When a viewer of a web page moves the cursor over a hyperlink and clicks, the link is executed and the linked file retrieved, and that file need not be located on the same server as the original file.

30

A client computer typically retrieves documents on the web using a browser, such as Netscape Navigator™ or Microsoft Internet Explorer™, which utilises a HTML interpreter to execute HTML instructions to display a page.

- 2 -

The number of web pages accessible by a client computer is enormous and constantly growing. However, a characteristic of the web is that all web pages are created, maintained, and delivered by the hosts. Clients which connect to the hosts simply display the web pages by interpreting the embedded HTML commands using the browsers. Users on the Internet are therefore effectively readers of information presented by editors of the web pages on the hosts, who are often referred to as "webmasters".

As the web is accessible by millions of users with a great diversity in language, culture, religion, interests, literacy and training, a webmaster simply cannot cater to every user's needs. A typical webmaster will therefore choose to satisfy the largest number of target users possible, and this usually means presenting the content using American English. In some cases, a webmaster serving a small group of target users may choose to use language specific to the group. For example, a web page intended for medical doctors' consumption may contain a lot of medical terms which render the document incomprehensible for users without appropriate training. Users on the web can therefore be frustrated by his or her inability to understand the content of the web pages. This defeats the original purpose of the web being a huge information resource.

Summary of the Invention

20

In accordance with the present invention there is provided a method of annotating displays, including:

- requesting display data;
- receiving and processing said display data for display items which require annotation;
- 25 generating a display, using said display data, with said display items including respective annotations in said display; and
- accessing and displaying item data for one of said display items on selection of the respective annotation for said one of said display items.

30

The present invention also provides an annotation module stored on a computer readable medium, including an interception module for receiving and processing requested display data for display items which require annotations, and adding annotation data to said display data to cause generation of a display, using said display data, with said display items including respective annotations in said display.

35

- 3 -

The present invention also provides a computer apparatus for annotating displays, including:

means for receiving and processing display data for display items which require annotation;

5 means for requesting said display data and generating a display, using said display data, with said display items including respective annotations in said display; and

means for accessing and displaying item data for one of said display items on selection of the respective annotation for said one of said display items.

10 Brief Description of the Drawings

Preferred embodiments of the present invention are hereinafter described, by way of example only, with reference to the accompanying drawings, wherein:

Figure 1 is a block diagram of a preferred embodiment of a computer system including
15 an annotation module; and

Figure 2 is a block diagram of components of the annotation module.

Detailed Description of the Preferred Embodiments

20 An annotation module 4, as shown in the Figures, operates in tandem with a conventional document-retrieval facility, such as a web browser 45, by altering requested document data, such as web pages, in real-time after they have been retrieved from the hosts, but before being displayed to the users. The module 4 annotates the documents with links which can access additional explanation of selected words. The module 4 scans the
25 retrieved documents and identifies words which are likely to be incomprehensible to the user, and annotates these words, typically with inconspicuous bullets next to these words. The annotated documents are then passed on to a display device, such as the web browser 45, for display to the user. While reading the document, the user can choose to click on any bullet if additional information about the associated word is required. The explanation can
30 contain a translation, word sense, or example of usage or any other appropriate reference which is displayed in a separate window.

- 4 -

The annotation module 4 monitors a user's reaction to the annotations and retains use data for effectively learning the user's preference. The use data is used subsequently to determine how a word should be annotated in subsequent documents. User preference is determined from the use data by the cumulative number of times an annotation is retrieved or ignored, or by an explicit user statement. The module 4 also allows dictionaries to be updated or replaced.

A computer system 2, as shown in Figure 1, which includes the annotation module 4, can operate as a network client and may be a personal computer running WINDOWS™.

10 The system 2 includes a bidirectional bus 20, over which all system components communicate, at least one mass storage device (such as a hard disk or optical storage unit) 22, and a main system memory 24. Operation of the system 2 is directed by a central-processing unit (CPU) 26. A conventional communication platform 30, which includes suitable network interface capability and transmission hardware, facilitates connection to and

15 data transfer through a computer network 31, such as the Internet, over a telecommunication link 33. The user interacts with the system using a keyboard 35 and a position-sensing device (e.g. a mouse) 37. The output of either device can be used to designate information or select particular areas of a screen display 39 to direct functions to be performed by the system 2.

20

The main memory 24 includes a group of executable software modules that control the operation of CPU 26 and its interaction with the other hardware components. The modules include the annotation module 4 and the web browser 45. An operating system (not shown), such as WINDOWS 95™, directs the execution of low level, basic system functions

25 such as memory allocation, file management and operation of mass storage device 22, multitasking operations, input/output and basic graphics functions for output on screen display 39. The user's primary interactions with the system occur using the web browser 45, which contains functionality for locating and fetching, via the network 31, data, such as web pages, each identified by a Universal Resource Locator (URL), temporarily storing and

30 displaying these, executing hyperlinks contained in web pages and selected by the user, and generally interpreting web page information.

- 5 -

The annotation module 4 includes a control module 48 which interacts with the web browser 45, a web interface 50, which interacts with the communications platform 30, and a dictionary module 52 which includes dictionary entries for various terms, which include words or phrases. The control module 48 accesses web items from the web interface 50, which communicates with the communication platform 30 and stores retrieved web page data in the manner of a web browser 45. The web interface 50 provides the same interface to the communications platform 30 which the web browser 45 would normally provide, for example an interface which works with Winsock™ that may be part of the communications platform 30.

10

The control module 48, as shown in Figure 2, includes an interception module 104, a usage analysis module 102 and a term preference module 106. The interception module 104 annotates data or web items of a web page using the term preference module 106 and the dictionary module 52. The interception module 104 processes the web page data stored by the web interface 50 in real-time as it is passed to the web browser 45, so that a user of the browser 45 is unable to notice any latency introduced by the interception module 104 in generation of the web page display. The web page data is scanned by the module 104 for all text items which may require annotation. Using the accessed text items, the interception module 104 consults the term preference module 106 to determine if the user prefers to have an item or term annotated. The term preference module 106 designates terms by weights or values which indicate the level of user preference. Terms with preference values lower than a threshold are considered "non-preferred" to indicate that a user does not require them to be annotated. An accessed term which is not marked "non-preferred" and which has a corresponding entry in the dictionary module 52 is selected for annotation. Selection is performed in real-time using either automata, hashing tables or a quick tree-search when processing the web page data. Dictionary entries accessible by the dictionary module 52 include respective hyperlinks to data relating to a term, which normally comprises explanatory text or a translation. If a term is selected, the interception module 104 inserts a display bullet with the accessed appropriate hyperlink in the processed web page data so that the bullet will appear close to the annotated web item. The interception module 104 then passes the annotated page to the web browser 45 for display.

Once a page has been annotated, a user is able to access item data corresponding to a web item by using the position-sensing device 37 to select the corresponding bullet and associated hyperlink. On selection of the link, the request for the item data passes via the

- 6 -

usage module to access a HTML file which may be maintained by the dictionary module 52 or which can be generated by a program stored on the system 2. The file contains the requested item data, which normally would be stored on the system 2. The file is accessed via the browser 45 in the same manner as for any other hyperlinked file.

5 The usage analysis module 102 observes how a user interacts with the inserted annotations or bullets. Based on the observations, the usage analysis module 102 sends messages to the term preference module 106 to update the preference values which indicate the level of user preference. Actions monitored by the usage analysis module 102 include:

- 10 1. The cumulative number of times the user has clicked on bullets associated with a term.
2. The cumulative number of times the user has ignored bullets associated with a term.
3. Whether the user has saved a reference to the term, e.g. by adding the term
- 15 using the usage analysis module 102 to a host term list maintained by the term preference module 106. Such action represents an explicit indication of interest in the term.

Raw data associated with the above is stored within the term preference module 106
20 for further processing. The primary purpose of term preference module 106 is to decide whether a user is interested to have a term annotated. The annotation module 4 can be provided with means for the user to manually reset the term preference module 106, clear all previous preferences, and change the threshold value which determines whether a term is considered "non-preferred". This enables the user to signal a complete change of interest.

25 The dictionary module 52 enables the user to manually add, modify and delete any dictionary entries, or substitute a completely different dictionary. This capability enables the user to have different terms annotated, or have the same term annotated with different types of dictionary entries.

30 All of the components and modules of the annotation module 4 can be implemented using the Java programming language, so that they can either be installed locally, or loaded and executed as required.

- 7 -

The annotation module 4 is not limited to use on the Internet. The architecture described above can, for example, be used directly with local area networks of computers communicating via, for example, the Ethernet protocol. In a local area network, the computers can implement TCP/IP over the low level Ethernet hardware management
5 routines to create an intranet, or can instead (or in addition) be tied into the Internet as a node, via, for example, a telephone hookup to an external host computer serving as a commercial Internet service provider. Alternatively, the system can be used with other forms of document-viewing facility (whether these involve a computer network or a single machine) by replacing web interface 50 with an appropriate retrieval system, so as to alter retrieved
10 data in real-time before being displayed to a user.

Many modifications will be apparent to those skilled in the art without departing from the scope of the present invention as described herein.

- 8 -

CLAIMS

1. A method of annotating displays, including:
requesting display data;
5 receiving and processing said display data for display items which require annotation;
generating a display, using said display data, with said display items including
respective annotations in said display; and
accessing and displaying item data for one of said display items on selection of the
respective annotation for said one of said display items.
10
2. A method as claimed in claim 1, wherein said annotations comprise links to respective
item data.
3. A method as claimed in claim 1, wherein said processing of said display data and
15 adding said annotations thereto occurs in real-time
4. A method as claimed in claim 2, wherein the method is executed on a machine
connected to a communications network.
- 20 5. A method as claimed in claim 4, wherein said display data is received from said
network and said item data is accessed from said machine.
6. A method as claimed in claim 1, including:
monitoring selection of said annotations;
25 storing preference data; and
determining display items which require annotations on the basis of said preference
data.
7. A method as claimed in claim 6, wherein said preference data includes a number of
30 respective times annotations have been selected, and a list of said display items maintained
by a user.
8. A method as claimed in claim 1, wherein said display items include terms in

- 9 -

documents and said item data includes dictionary entries for said terms.

9. A method as claimed in claim 4 or 5, wherein said network is the Internet.

5 10. A method as claimed in claim 9, wherein said display data is web page data.

11. An annotation module stored on a computer readable medium, including an interception module for receiving and processing requested display data for display items which require annotations, and adding annotation data to said display data to cause
10 generation of a display, using said display data, with said display items including respective annotations in said display.

12. An annotation module as claimed in claim 10, wherein said annotation data includes links to respective item data for said display items, such that selecting the respective
15 annotation causes display of respective item data.

13. An annotation module as claimed in claim 11, wherein said interception module processes said display data and adds said annotation data in real-time.

20 14. An annotation module as claimed in claim 12, wherein the computer readable medium is part of a machine connected to a communications network.

15. An annotation module as claimed in claim 14, wherein said display data is received from said network and said item data is accessed from said machine.

25

16. An annotation module as claimed in claim 15, wherein said network is the Internet.

17. An annotation module as claimed in claim 16, wherein said display data is web page data.

30

18. An annotation module as claimed in claim 12, including a preference module storing preference data which is used by said interception module to determine display items which require annotations.

- 10 -

19. An annotation module as claimed in claim 18, including a usage module for monitoring selection of said annotations and causing storage of said preference data in said preference module.
- 5 20. An annotation module as claimed in claim 19, wherein said preference data includes a number of respective times annotations have been selected, and a list of said display items maintained by a user.
21. An annotation module as claimed in claim 12, including an item module for maintaining
10 and providing access to said item data.
22. An annotation module as claimed in claim 21, wherein said display items include terms in documents and said item data includes dictionary entries for said terms.
- 15 23. An annotation module as claimed in claim 11, including an interface module for receiving and storing said requested display data for said interception module.
24. A computer apparatus for annotating displays, including:
means for receiving and processing display data for display items which require
20 annotation;
means for requesting said display data and generating a display, using said display data, with said display items including respective annotations in said display; and
means for accessing and displaying item data for one of said display items on selection of the respective annotation for said one of said display items.
- 25
25. A computer apparatus as claimed in claim 22, wherein said annotations comprise links to respective item data.
26. A computer apparatus as claimed in claim 24, wherein said processing means
30 process said display data and adds said annotations thereto in real-time.
27. A computer apparatus as claimed in claim 25, wherein said apparatus is connected to a communications network.
- 35 28. A computer apparatus as claimed in claim 27, wherein said display data is received

- 11 -

from said network and said item data is stored on said apparatus.

29. A computer apparatus as claimed in claim 25, including:
means for monitoring selection of said annotations; and
5 means for storing preference data for use in determining said display items which
require annotations.

30. A computer apparatus as claimed in claim 29, wherein said preference data includes
a number of respective times annotations have been selected, and a list of said display items
10 maintained by a user.

31. A computer apparatus as claimed in claim 30, wherein said display items include
terms in documents and said item data includes dictionary entries for said terms.

- 15 32. A computer apparatus as claimed in claim 27 or 28, wherein said network is the
Internet.

33. A computer apparatus as claimed in claim 32, wherein said display data is web page
data.

20

1/2

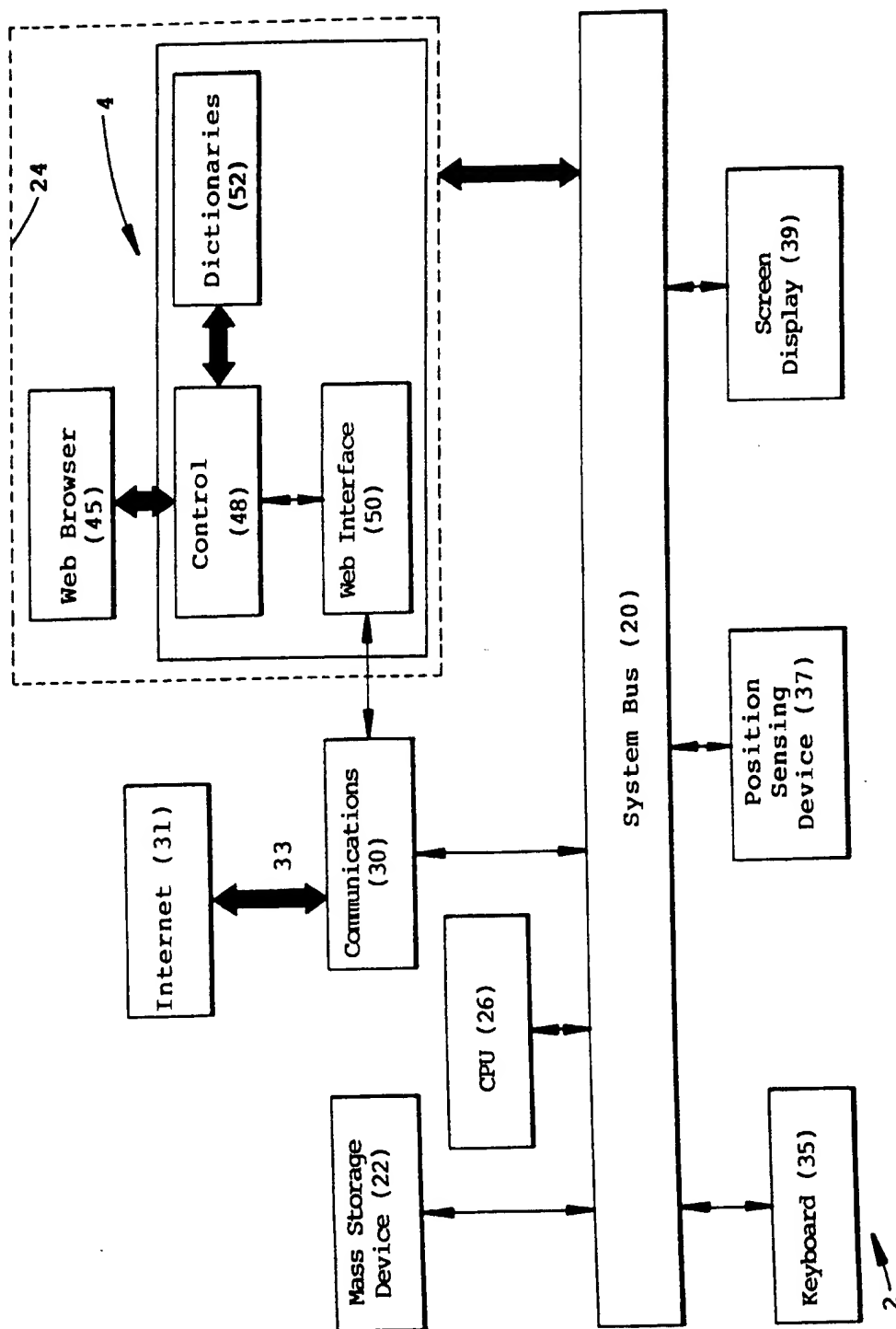


FIG 1

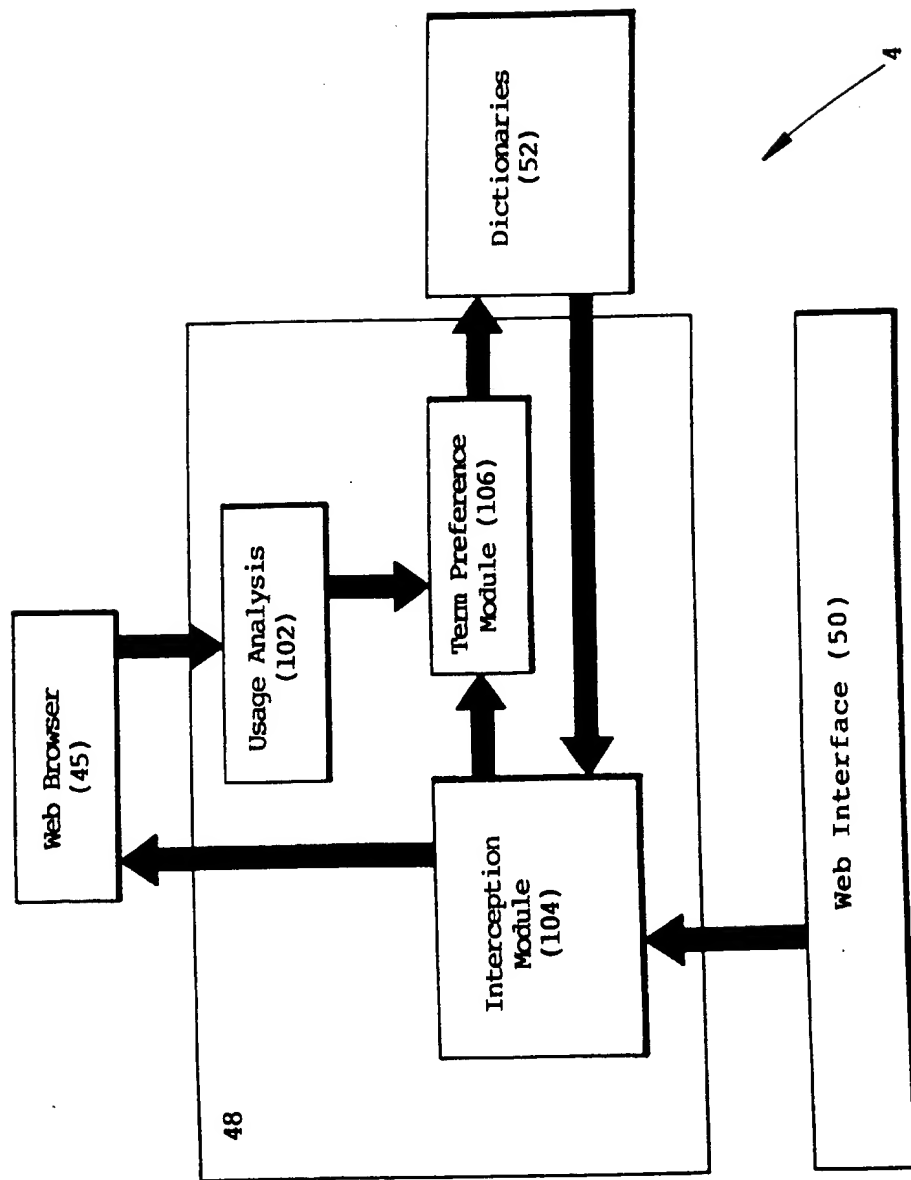


FIG 2

INTERNATIONAL SEARCH REPORT

International application No.

PCT/SG 97/00022

A. CLASSIFICATION OF SUBJECT MATTER

IPC⁶: G 06 F 17/24

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC⁶: G 06 F 17/24

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

WPIL

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	EP 0 762 297 A2 (SUN) 12 March 1997 (12.03.97), claims 1-11.	1-33
X	EP 0 477 173 B1 (WANG) 09 October 1996 (09.10.96), columns 2-4.	1-9, 11-16, 18-19, 21-32

☐ Further documents are listed in the continuation of Box C.☒ See patent family annex.

* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search

20 May 1998 (20.05.98)

Date of mailing of the international search report

09 June 1998 (09.06.98)

Name and mailing address of the ISA/ AT
AUSTRIAN PATENT OFFICE
Kohlmarkt 8-10
A-1014 Vienna
Facsimile No. 1/53424/535

Authorized officer

Fastenbauer

Telephone No. 1/53424/447

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.

.PCT/SG 97/00022

In Recherchenbericht angeführtes Patentdokument Patent document cited in search report Document de brevet cité dans le rapport de recherche		Datum der Veröffentlichung Publication date Date de publication	Mitglied(er) der Patentfamilie Patent family member(s) Membre(s) de la famille de brevets	Datum der Veröffentlichung Publication date Date de publication
EP A2	762297	12-03-97	EP A3 762297	19-03-97
			JP A2 10027143	27-01-98
EP B1	477173	09-10-96	AU A1 46276/B9	07-01-91
			AU B2 652120	18-09-94
			CA AA 2003231	02-12-90
			DE C0 68927327	14-11-96
			DE T2 68927327	30-04-97
			EP A1 477173	01-04-92
			EP A4 477173	23-12-92
			JP T2 4507309	17-12-92
			WO A1 9015380	13-12-90